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ABSTRACT

Despite significant improvements in the acquisition and use of learning technologies by schools with large percentages of minority students, data collected by the New York State Education Department indicate that schools serving predominantly black and minority students--many of whom are economically disadvantaged--do not provide access to technology comparable to that provided by affluent schools. To maximize the benefits of technology in education, the following is necessary: (1) before policy formation and planning, it must be determined what technology would most effectively achieve instructional, management, administrative, and equity goals; (2) poorer districts should receive state funding; (3) state programs for hardware and software aid should be modified to provide flexibility and technical assistance. Further suggestions deal with eliminating bias in software, staff development, developing a center for advanced technology, and research activities. The report contains a list of references, and the following: (1) a list of State agencies concerned with educational technology in New York; (2) a copy of the State educational policy concerned with technology and recent initiatives; and (3) information on current legislation concerned with technology and education. (PS)

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TECHNOLOGY IN THE SCHOOLS: SERVING ALL STUDENTS

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1986

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ACKNOWLEDGEMENTS

This paper is based on a study of the uses and impact of learning technologies in New York public schools serving large numbers of Black and minority students. In addition to a review of State legislation, policy and funding, interviews were conducted with persons responsible for technology applications in the six largest districts in the State: New York City, Buffalo, Rochester, Syracuse, Yonkers, and Albany. These districts serve 83.8% of all Black students enrolled in the State's public schools. The author wishes to thank those local educators who contributed their time and expertise in making the study possible. In addition, grateful acknowledgement is made to Dr. Peter Stoll, Assistant Director of the Center for Learning Technologies for his concern regarding the subject of this examination and for providing invaluable assistance in obtaining data on State policies and initiatives, and for reviewing early drafts of this paper.

Finally, the author is grateful to the New York State Governor's Advisory Committee for Black Affairs for the support necessary to conduct this investigation.

Throughout New York State, various technologies are increasingly finding their way into elementary and secondary classrooms. During the last three years, the number of microcomputers in New York schools has grown from 29,000 to 106,224 (Center for Learning Technologies, 1986, Table 1). In the past year there has been a 40% increase in the number of video players acquired by school districts. Telecommunications technologies now provide schools with an unprecendented capactity to receive programming through local area networks, satellite broadcast and cable networks (Center for Learning Technologies, 1986, page 2). State fiscal support of approximately $21 million per year for hardware and software has been instrumental in stimulating this growth. Local districts have also devoted substantial resources to the acquisition of learning technology. For example, the New York City Board of Education has appropriated $25 million over the last three years to purchase computers.

The phenomenal growth in the use of technology in our schools parallels a trend seen nationwide. Computers, interactive disk, and telecommunications technology represent potentially potent tools to enhance teaching and learning.

Despite significant improvements in the acquisition and use of learning technologies by schools with large percentages of minority students, data collected by the State Education Department indicate that schools serving predominantly Black and

minority students -- many of whom are economically disadvantaged -- do not provide access to technology comparable to that provided by affluent schools.

For example, while the 1985 statewide ratio of computers was one for every 29 K-12 students, lower wealth districts (which in many cases serve predominantly non white student populations) had a ratio of one computer for every 56 students. Similarly, in 1985, in districts where 1-10% of the students were on welfare there was a ratio of 25 students per microcomputer and nearly 60% of the students used computers regularly, while in districts in which 91-100% of the students were on welfare, the ratio was 33 students per microcomputer and less than 41% of the students used computers regularly (Center for Learning Technologies, 1985).

In 1985, the Statewide average of microcomputers per public school was 23. In public schools in which more than 50% of the students were from families whose primary means of support was a public welfare program, the average number of microcomputers per school during the same year was 18 (Center for Learning Technologies, 1986, Table 5).

New York City Public Schools, with 36% of the total State public school enrollment, possess less than 27% of all microcomputers found in the State's public schools. The other large urban districts in the State also report inequities in the amount of State aid received for technology relative to the size

of their enrollments.

Access, however, is not the only cause for concern, but also differentials in the quality of interactive materials and actual uses of available equipment. Gordon and Armour-Thomas (1985) summed up the dilemma of access and quality:

> Perhaps more quantity of effort has been expended on problems of educational equity and greater quality of effort has gone toward problems of educational excellence. In addition these different efforts have been expended on different populations -- quantity on the disadvantaged and quality on the more affluent (p. 29).

Issues of access and excellence also involve more than ensuring that all schools possess the same array of hardware and software. Economically advantaged students are much more likely to have access to interactive technology in their homes and communities than economically disadvantaged students, who generally lack opportunities to reinforce technology-related skills outside the formal school environment. There also appear to be differentials in the extent of technology integration throughout the curriculum that can be correlated with the poverty status of schools, particularly in the key curriculum areas of science and social studies (Center for Learning Technologies, 1986, Tables 20 - 30).

Gordon and Armour-Thomas (1985), Hasselbring (1984), and Sheingold 1985) suggest a number of key elements upon which a framework for effective uses of instructional technology should

be based.

- o an assessment of current and projected economy and labor market needs
- o congruence with statewide educational goals and objectives
- o concern for the diverse educational needs of students and validated appropriateness of specific technologies for specifically diagnosed educational needs
- o a building level needs assessment based on staff, physical resources, student population, and curriculum
- o comprehensive district planning informed by school and community needs and resources
- o state and local coordination and support

In addition, the mere presence of advanced technology in the schools does not ensure that more learning is taking place in the classroom or that instructional delivery has been enhanced. On the contrary, the availability of technology can often mask deficiencies in the teaching-learning process, create false expectations, or cause educators to "rest on their oars." The introduction of learning technologies has implications for new ways of perceiving the role of teachers:

> A teacher guiding students working together on computers in pairs or in groups requires observational and management skills different from the ones she normally applied, as well as new understanding about when and how to intervene in the student-based activity (Sheingold, 1985, p.8).

Efforts to utilize technology to reduce the teacher's role to that of a bystander, or to "teacher-proof" the curriculum through

technology do not recognize the significant interpersonal variables so important in the education process, especially for minority students whose prior unrewarding educational experiences require individualized instruction. There is little or no evidence that "teacher-proofing" instruction through technology has resulted in significant benefit to students. There is however, abundant evidence that an instructional strategy utilizing appropriate technology and managed by trained teachers can impact positively on the learning of various groups of students.

State and local policies designed to enhance the achievement of at-risk students should also include the reduction of barriers between school and community. Students from affluent environments often have access to various interactive technologies within the home environment. This access serves to reinforce in-school technology experiences. Economically disadvantaged students, on the other hand, usually lack this type of reinforcement. Creative ways must be found to expand access within the community. Cultural institutions and libraries, community centers, and churches are all potential sites for providing students and parents with an opportunity to utilize instructional technologies to supplement school activities.

Finally, there is currently a tremendous void in the training services available to many individuals who work in adult education or adult literacy programs. Many of these individuals,

often working as part of the programs of community-based organizations, are ineligible for training sponsored by the local education agency, the Teacher Resource and Computer Training Centers, or the Center for Learning Technologies. While they often have access to technology (particularly microcomputers and telecommunications equipment, i.e., video equipment), they may lack the skills to use available technology effectively. Learning technologies represent potentially powerful tools for adult education; however, ways must be found to develop the technological expertise of adult educators.

CONCLUSION

The use of learning technologies will not inherently result in more effective teaching and learning. In order to maximize the benefits of technology, policy and planning must encompass a process of determining what technology would be most effectively employed in relation to specific instructional, management, administrative and equity concerns. The Technology Applications Planning Program (TAP), based on a nationally recognized school planning model holds the potential for helping local educational agencies to develop comprehensive K-12 plans for technology based on educational goals and objectives, parent and community involvement, ongoing staff development, integration throughout the curriculum and access for all students (State Education Department, Center for Learning Technologies). State funding should be provided to low wealth districts to offset expenses

required to implement TAP. Additional funding should also continue to be alloted to low wealth school districts and districts with high concentrations of Black students for the acquisition of learning technology systems and implementation assistance. Because of the varying needs of districts and the varying availability of technology resources, the State program for providing hardware and software aid should be modified from the current requirement of a fixed percentage of the total allocation that can be spent for each to a greater flexibility in determining how much of the total allocation is to be spent for hardware and for software as well as for technical assistance.

In order to maximize the potential of learning technologies to enhance the learning of all students, the following should also be considered by the State Education Department, local education agencies and teacher training institutions:

- Each district should evaluate computer software and other programming for race, sex or ethnic bias and stereotypes. The SED should use events like the Publishers' Software Forum to inform producers of interactive instructional materials of State policy prohibiting bias and stereotyping in software and other educational programming.
- Ongoing staff development for teachers and administrators should be required to provide training in uses of technology and working with diverse student populations.
- The State University of New York should develop a center for advanced technology similar in funding and organization to already-established centers in science and industry to study the use of technology as a learning tool for teaching diverse student populations including urban students, and in conjunction with this center should support the development and dissemination

of effective models of staff development.

- The State Education Department's research agenda should include an emphasis on identifying promising practices in the use of technology to enhance the academic achievement of underserved student populations. To this end, sites selected for the Model Schools Technology Project and other demonstration projects sponsored by the SED should include districts that have large concentrations of minority and at-risk students. The personnel selected to be involved in State-supported research and development activities should also reflect the diversity of the State's population.

- Teacher training programs should immediately consider implementing the recommendation of the Teacher Education, Certification, and Practice Board that colleges "include experiences in teacher preparation programs that will ensure that graduates are aware of emerging technology, able to use it in instruction, and sensitive to its impact on pupils.

The underachievement of large numbers of traditionally underserved students requires concerted and innovative approaches to the use of technology to maximize potential for learning. Clearly, New York State has made progress in increasing student access to learning technologies due in part to State policy which has directed technology acquisition aid to districts in need of such aid. Continued and coordinated efforts must be targeted toward improving both access to and the applications of learning technologies in all New York schools.

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APPENDIX 1

STATE AGENCIES AND BODIES CONCERNED PRIMARILY WITH TECHNOLOGY IN NEW YORK STATE

REGENTS ADVISORY COUNCIL ON LEARNING TECHNOLOGIES

This body, consisting of representatives from education, public television and various technology industries, was appointed to foster effective alliances between educators and producers in support of Regents initiatives for revitalizing the State's economy. The Advisory Council provides policy and legislative guidance to the Education Department relative to learning technology and telecommunications applications. The current focus of the Advisory Council is on adult literacy, preservice/inservice teacher education, distance learning, and instructional technology policy and aid.

NEW YORK STATE EDUCATION DEPARTMENT CENTER FOR LEARNING TECHNOLOGIES

The Center adminsters and coordinates activities of the State Education Department related to the use of appropriate technologies. Most of the Center's activities are conducted as cooperative ventures with other Department units.

Resources of the Center include a technology training facility and media network for duplication and distribution of computer and video programs. Current program areas comprise technology planning and development, telecommunications, technology staff development and media distribution, video production, and field services.

STATE EDUCATION DEPARTMENT INTRADEPARTMENTAL TASK FORCE ON LEARNING TECHNOLOGIES AND TELECOMMUNICATIONS

This body was created to provide internal guidance and policy recommendations related to the implementation of the Regents-approved "Learning Technologies and Telecommunications in New York State: Action Recommendations." Membership consists of representatives of the four main offices of the State Education Department (Cultural Education, Elementary/Secondary/ Continuing Education, Higher Education, and Vocational Rehabilitation) as well as the Center for Learning Technologies.

NEW YORK STATE TEACHER RESOURCE AND COMPUTER TRAINING CENTERS

These centers were created by the State Legislature in 1984 to provide the school districts and teachers of the State with an opportunity to develop systematic, ongoing inservice programs, to assure the dissemination and application of educational research developments to classroom instruction, to develop new curricular materials specifically designed to meet the educational needs of the students served, and to provide sites where teachers can be trained in the use of computers as teaching aides.

Currently, the program is funded at $10 million and supports 74 centers throughout the State. Approximately 179,000 teachers are reported as being served. Grants are awarded by the Commissioner of Education to the Centers on the basis of an annual application.

APPENDIX B

STATE EDUCATION POLICY CONCERNED WITH TECHNOLOGY AND RECENT INITIATIVES

"Learning Technologies and Telecommunications in New York State: Action Recommendations" sets forth the Board of Regents' goals with respect to the role of technology in our schools.

EXCELLENCE: Interactive learning technologies and telecommunications must be used to achieve quality within our educational system and the applications must reflect the highest standards.

EQUITY: Technological resources, including the information conveyed by these technologies, must be available to all on an equitable, nondiscriminatory, and nonstereotyped basis.

EFFICIENCY: Interactive learning technologies and telecommunications must be employed to achieve greater efficiency in the use of educational resources and enhanced professional effectiveness.

These three goal areas provide the basis for a number of activities recently conducted by the State Education Department. Following is a review of those activities that pertain specifically to traditionally underserved students and equity of access to technology. Many of the initiatives conducted are targeted to special education and vocational rehabilitation.

1. Initiation of technologies within Office of Vocational

Rehabilitation locations to provide enhanced learning and occupational opportunities for the disabled.

2. Development of computer training curricula for special education.

3. Conduct of courses for field-based professionals who work with the developmentally disabled.

4. Coordination with computer companies to support technology applications for special education.

5. Development of a video production to assist disabled individuals prepare for, enter, and maintain employment.

6. Promotion and dissemination of teleconferences on special education and linkages to the world of work.

7. Production of video materials with the Office of Vocational Rehabilitation on the preparation of resume.

8. Development of a computerized inventory control system to enhance access to public library services for blind, visually and physically handicapped.

9. Development of legislative proposals related to staff development for special educators and the acquisition of

technologies for the disabled. (proposed but not funded)

10. Establishment of a Center for Computing and Disability.

11. Implementation of a pilot program to acquaint occupational education teachers with practical information about inequities existing in computer access and strategies for promoting gender, race and ethnic equity in the use of technology for instruction.

12. Development of a legislative proposal for the replication of the Center for Learning Technologies in regions serving economically disadvantaged and minority populations. (proposed and currently being considered).

13. Establishment of a mechanism whereby the Division of Civil Rights and Intercultural Relations works with the Office of Elementary, Secondary and Continuing Education to coordinate implementation of policies and activities related to educational equity.

14. Development of a legislative proposal to provide $4.3 million to expand the science and technology entry program (STEP) for economically disadvantaged and minority students in higher education.

15. Conduct of surveys of availability and use of technology, k-12 and higher education.

16. Negotiation of statewide price discounts and grant award programs with technology companies and vendors.

17. Development of a consortium of educational and cultural institutions to develop a model process for acquiring and disseminating software, film, and video programming.

18. Development of relationships with vendors, consortia and interstate agencies to acquire and distribute technology programming.

19. Efforts to expand access of low wealth and minority populations to State video tape holdings.

20. Development of new publications on technology planning, applications and technical assistance.

21. Expansion of the Teacher Resource and Computer Training Center Program.

22. Development of a databank of computer software.

23. Development of proposals to provide aid in acquiring and implementing learning technology systems for low wealth districts. (proposed but not funded)

24. Coordination to ensure that public television and radio are

available to all New Yorkers.

25. Investigation of electronic mail, messaging, and voice messaging technology as vehicles to provide equitable access to critical information and resources.

26. Dissemination through a monthly newsletter of information on legislation, policy, products, services, programs and projects related to learning technology.

27. Development of a computer program designed to assist educators in carrying out special education requirements.

28. Production of a teleconference on equity.

APPENDIX C

CURRENT LEGISLATION CONCERNED WITH TECHNOLOGY AND EDUCATION

ES-83/86

TITLE: An Act Making an Appropriation for the Purchase and Distribution of Instructional Video Programs and Computer Software ($1,000,000)

PURPOSE: To provide funds for the Education Department to purchase the right to distribute instructional video programming and computer software, which would be disseminated to school districts, BOCES, and chartered colleges, universities, post-secondary institutions, libraries, museums and public educational television stations.

DISCUSSION: Local districts, BOCES and public educational television stations in the State currently spend $5 million per year on the purchase and distribution of video and computer materials. The purchasing institution shares the material with its constituents and other institutions in the State do not benefit. This bill would allow the Education Department to purchase and distribute materials to any institution in the State at reduced rates based on the cost of reproduction and mailing.

ES-74/87

TITLE: An Act to amend the education law, in relation to providing for the creation of a New York distance learning program for elementary, secondary, postsecondary and adult

learning programs and making an appropriation therefor ($1,500,000)

PURPOSE: This proposed legislation calls for the establishment of a State distance learning program under the direction of the Commissioner of Education. Distance learning refers to the provision of interactive instructional or training opportunities utilizing electronic audio, video and data telecommunications devices and related systems to link two or more remote locations.

DISCUSSION: While distance learning has been highly touted as a means whereby low wealth districts can benefit from highly qualified instructors and resources located elsewhere and transmitted via cable, satellite, or dish, the main applications to date have been rural and small school districts. Of 37 planned and operating distance programs in the State, only 1 k-12 program (focus on calculus) has been implemented in an area with a significant number of Blacks (Buffalo). A distance learning program to serve the New York City area is planned for fall 1987.

ES-84/86

TITLE: An Act to Authorize the Education Department to Replicate its Center for Learning Technologies Computer Training Facility ($1,000,000)

PURPOSE: To fund the replication in two selected sites in New York of the Center for Learning Technologies Computer Training Facility and staff development program to provide high quality

technology staff development services to professional staff in educational and cultural institutions that serve low wealth and minority populations.

DISCUSSION: While ED currently operates a staff development and computer training facility in Albany, the program is unable to serve educators in all regions in the State because of a limited capacity of the Center to accomodate educators and because of the distance of the Center (in Albany) from some areas of the State. Replication of the program in Western New York and in New York City (sites have not been determined) would help to alleviate this problem and would create the potential for greater access to technology training.